DECOMPRESSION COMPUTER

OPERATING MANUAL

American

ALADIN® PRO

SWISS MADE BY UWATEC AG

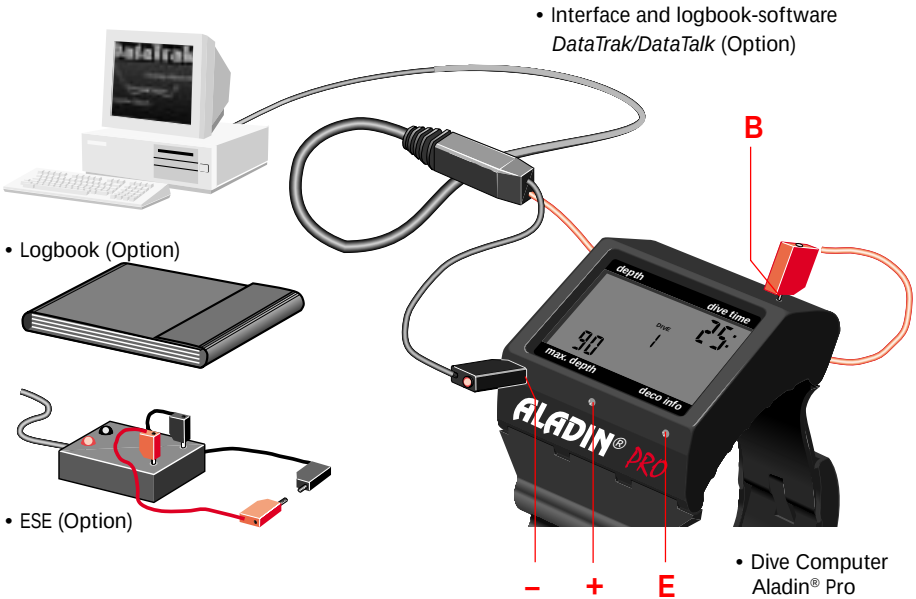
You must carefully read this entire manual before using your Aladin® Pro.

WARNING

Diving has many inherent risks. Decompression sickness is among the most serious of those risks. Even if you follow the instructions of this manual in a careful fashion, it is still possible that you may be seriously injured or die from decompression sickness or some other inherent risk of scuba diving. Unless you are fully aware of these risks and are willing to personally accept and assume responsibility for those risks, do not use the Aladin® Pro!

The Aladin® Pro is a sophisticated decompression tool to assist a trained and certified diver in making decisions concerning dive planning and execution. As with any tool, the Aladin® Pro may be misused if the following safety and operational precautions are not strictly followed. If they are followed, careful use of the Aladin® Pro can increase your diving enjoyment and reduce your risk of decompression sickness. If they are not, you will be placing yourself at serious risk for decompression sickness.

While the Aladin® Pro is a technically advanced tool based on a biophysical model of decompression sickness, neither it nor any other diving computer (or table) can actually monitor the physiological changes that occur in your body as you dive. In addition, each diver will vary in his or her susceptibility to decompression sickness. Not only that, but each individual diver‘s own susceptibility may vary from day to day. Combined with the fact that decompression modelling is an inexact science, and of necessity must be based at least partly on certain unproven assumptions, it is incumbent upon you, the individual diver, to dive responsibly and to carefully follow all standard safe diving practices as well as the admonitions contained in this manual.


• Interface and logbook-software
DataTrak/DataTalk (Option)
B
• Logbook (Option)
depth
dive time
max. depth
deco info
ALADIN® PRO
• ESE (Option)
–
+
E
• Dive Computer
Aladin® Pro

Important remarks concerning signal words and symbols

This operating manual makes use of the following icons to indicate especially important comments:

Remarks: Informations and tips which are important for optimal use of the functions of your Aladin® Pro.

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

The following symbols are used in the operating manual:

flashing display

acoustic alarm signal

Operating instruction for manual input
(Example: bridging contacts B and E)

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Guidelines for the use of Aladin® Pro:

The following guidelines for using Aladin® Pro are derived from the latest medical research and the recommendations of the American Academy of Underwater Sciences for diving with diving computers. Following these guidelines will greatly increase your safety while diving, but cannot guarantee that decompression sickness will not occur.

- In accordance with the recommended maximum diving limit of all instructional agencies, do not dive deeper than 130 feet.
- Do not use the Aladin® Pro for planned decompression diving. The decompression algorithm contained in the Aladin® Pro should be used only for emergency or unintended decompression.
- On all dives with the Aladin® Pro, make a safety stop for three to five minutes within the ten to thirty feet zone.
- Never use the Aladin® Pro for repetitive, "square" dives deeper than 60 feet. A square dive is a dive that is performed for its duration at a uniform depth.
- Always make the deepest dive of the day first when repetitive dives are planned, and for each successive dive make sure that the deepest portion of that dive is done at the beginning of the dive.
- The Aladin® Pro is designed for dives made with compressed air only. Do not use the Aladin® Pro for dives made with nitrox or other mixed gases.
- All divers using dive computers to plan dives and indicate or determine decompression status must use their own computer.

- If the Aladin® Pro fails at any time during the dive, the dive must be terminated, and appropriate surfacing procedures (including a slow ascent and a 3 to 5 minute safety stop) should be initiated immediately.
- On any given dive, all divers in a buddy group must follow the most conservative dive computer for that particular dive.
- You should not dive for a period of twenty-four hours before activating the Aladin® Pro to use it to plan or control your diving.
- You MUST follow the ascent rates as indicated by the Aladin® Pro, and should the computer fail for any reason, you must ascend at a rate of no greater than 60 feet per minute.
- You MUST be familiar with all signs and symptoms of decompression sickness before using the Aladin® Pro! Seek IMMEDIATE treatment for decompression sickness should any of these signs or symptoms occur after a dive! There is a direct correlation between the efficacy of treatment and the delay between the onset of symptoms and the treatment for decompression sickness.
- Always observe the optical and acoustic alarm signals of the Aladin® Pro. Avoid situations of increased risk for decompression sickness which are marked with a warning sign in this operating manual.
- Never dive the Aladin® Pro to the limit. Neither the Aladin® Pro, nor any other diving computer or decompression table should be pushed to its limit. Give yourself a margin of safety by always leaving at least a few minutes in the “no-stop“ box before making your ascent.
- Avoid repeated ascents and descents (yo-yo diving) while using the Aladin® Pro.

LIST OF CHAPTERS

I	**INTRODUCTION**	1
II	**ALADIN® PRO – SURVEY**	9
III	**DIVING WITH ALADIN® PRO**	23
IV	**DIVING AT REDUCED RISK WITH ALADIN® PRO**	45
V	**LOGBOOK**	55
VI	**DIVE PLANNER**	61
VII	**INTERFACE**	69
VIII	**TROUBLE SHOOTING**	73
IX	**APPENDIX,** Maintenance, Technical Information, Warranty	77

I INTRODUCTION

1. Aladin® Pro - With More Safety ____ **2**

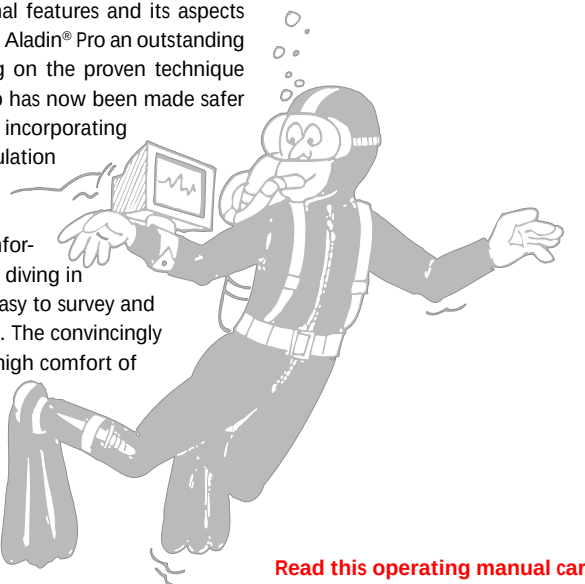
2. Aladin® Pro – Your Personal Companion ____ **3**

3. The Calculation Model ZH-L8 ADT
3.1 Description ____ **5**
3.2 Advantages ____ **7**

4. Safety in Diving ____ **8**

1. Aladin® Pro - With More Safety

The impressing operational features and its aspects of safety and quality make Aladin® Pro an outstanding diving computer. Building on the proven technique and finish the Aladin® Pro has now been made safer and more comfortable by incorporating a new, revolutionary calculation model.



Aladin® Pro desplays all information necessary for safe diving in such a manner that it is easy to survey and to be understood at once. The convincingly simple handling and the high comfort of carrying speak for themselves from the first dive.

The Aladin® Pro of the new generation brings you in possession of a device that guarantees more safety, quality and comfort in diving.

Read this operating manual carefully and to the last page.

2. Aladin® Pro - Your Personal Companion

Aladin® Pro considers your individual reactions during the dive, the cooling of your skin and includes your workload by a constant value in the calculations.
The latest results of medical and technical research were taken into consideration. As a special feature the calculation model also considers the formation of micro-bubbles in the venous circulation depending on workload and skin temperature.
This has led to the development of a unique, adaptive calculation model.
Aladin® Pro was exclusively designed for diving with compressed air and distinguishes itself from previous models and other commercial diving computers in a number of significant ways.

- The ZH-L8 ADT decompression calculation model considers eight body tissues as well as the diver‘s conduct and the ambient conditions. This allows for an even more precise calculation of a modeled risk for decompression sickness which can lead to greater diving safety.
- Compared to all previous models the Aladin® Pro is much more of a personal instrument, which considers the individual conduct of the diver.
  Different conducts of diving buddies can lead to distinctive differences in the display of the decompression information, since risk situations (violations of the diving rules) may have a strong influence by the anticipation of physiological processes. On the other hand, Aladin® Pro “rewards” a diving conduct following the rules with highest diving comfort.
- The diver‘s workload is incorporated in the decompression calculations as a constant value.
  The new calculation model considers for the calculation of the surface intervals and the decompression information for repetitive dives that the physical performance at the surface is less than during the dive.
- The Aladin® Pro uses both optical and acoustic alarms. The acoustic alarm uses varied sound signals to assist in establishing the reason for the alarm.

WARNING

You must strictly observe all optical and acoustic alarms and take appropriate action based upon those alarms to avoid serious injury or death from decompression sickness!

WARNING

Although the Aladin® Pro can be used to plan decompression dives, such dives are beyond the realm of recreational or sport diving and must not be attempted by recreational or sport scuba divers.

- By using the Aladin® Pro‘s logbook, a diver may directly call up information from the last 19 dives. When interfaced with a personal computer, 37 dives and 200 minutes of dive profile in intervals of 20 seconds can be read out.

- The dive planner allows the advance planning of no stop dives with readily determinable surface intervals.

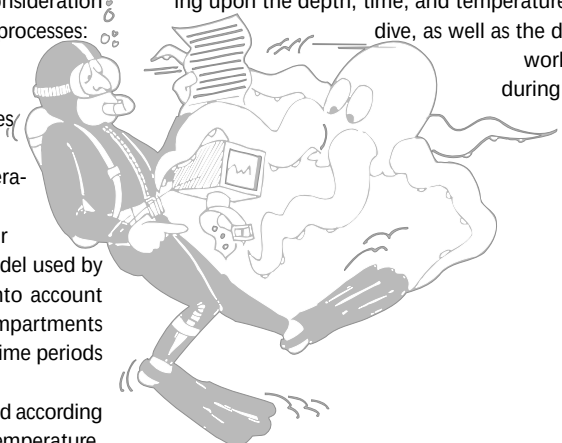
- Aladin® Pro is designed to be mounted on the diver‘s wrist or built in consoles. Ease handling, easy to watch and unambiguous arrangement of the data in the display, increase of diving safety without the loss of diving comfort and the possibility of transferring data to a personal computer are the main features of the Aladin® Pro comfort.

3. The Calculation Model ZH-L8 ADT

3.1 Description

The Aladin® Pro uses a new decompression calculation model known as the ZH-L8 ADT. This model uses eight compartments or "tissue" groups with nominal half time periods from 5 to 640 minutes. This model differs considerably from other models by its consideration of the following additional physiological processes:

1. Blood perfusion to the body's organs is not constant. Skin and muscle tissues are especially subject to changes in blood perfusion, depending on temperature and workload. Changes in blood perfusion to these organs change their nitrogen saturation tolerance. The model used by the Aladin® Pro takes these effects into account and thus the "skin" and "muscle" compartments in the Aladin® Pro show variable half-time periods and saturation tolerances.
   Decompression information is calculated according to the workload and decrease in skin temperature.



The decrease in skin temperature is based upon the water temperature and the dive time. By considering these changes in saturation, the time that must be spent at the surface prior to flying can be considerably lengthened, depending upon the depth, time, and temperature of a dive, as well as the diver's workload during that dive.

2. The decompression model used by the Aladin® Pro considers nitrogen in both its dissolved as well as its gaseous phase (microbubbles). Formation of microbubbles is considered to be a strong indicator of a high risk of decompression sickness. The Aladin® Pro model calculates the formation of microbubbels depending on various assumed influences in arterial and venous blood. In normal, slow ascents, microbubbles form mainly in venous blood. During fast ascents, microbubbles may also form in arterial blood and in the body's tissues as well. If a particular dive profile may result in the creation of microbubbles according to the Aladin® Pro's model, decreased bottom time and/or increased decompression times as well as increased "no fly" time will be indicated.

- Microbubbles can form if the diver makes too fast an ascent, ignores required decompression stops, or makes repeated ascents during a dive (yo-yo diving). These microbubbles can form in arterial blood as well as in the body's tissues. If these microbubbles partially impair circulation, the rate of gas diffusion and saturation tolerance for those tissues immediately surrounding this area of impaired circulation are changed. If required, both decompression time and -depth will be adjusted in such a way that already existing microbubbles will stop growing. Increased decompression time will also assist those local areas of impaired circulation to desaturate with less risk of decompression sickness.

- The calculation of microbubbles results in altered ascent instructions. If microbubbles are assumed to be present based on the data used by the Aladin® Pro, the ascent rate to the surface is reduced to 23 feet/minute. This will help prevent the formation of microbubbles in the arterial circulation and minimizes formation of microbubbles in the venous circulation after the dive.

3.2 Advantages

On the first dives following responsible diving procedures, a diver using the Aladin® Pro should never be required to decompress, although a three to five minute safety stop between ten and thirty feet is recommended for every dive. If, however, unplanned circumstances arise during the dive which increase the risk of decompression, the Aladin® Pro can, if closely followed, reduce the risk of decompression sickness by reducing remaining bottom time and/or increasing decompression time. Some of the more common risk situations are as follows:

- Repetitive dives, especially those deeper than 60 feet and those with short surface intervals.
- Repetitive dives using square dive profiles.
- Repetitive diving over the course of several successive days.
- Diving in cold water.
- Yo-yo diving (repeated descents and ascents to the surface during a given dive).
- Flying within 24 hours after diving.

If a diver experiences any of these risk factors while diving, the Aladin® Pro will decrease remaining bottom time without requiring decompression, or will add required decom-pression time in order to help minimize the risk of decompression sickness.

WARNING

Do not use the Aladin® Pro for planned decom-pression dives!

If signs or symptoms of decompression sickness occur after diving with Aladin® Pro, seek IMMEDIATE treatment at the nearest recompression facility.

4. Safety in Diving

With its new decompression model the Aladin® Pro is an extremely versatile tool which can increase your diving comfort and safety. As with any diving tool, however, ultimate responsibility for diving safety remains with the individual diver. The same responsible diving practices taught by all diving certification agencies are still absolutely necessary in order to safely dive with the Aladin® Pro.

Certain mistakes which may be made by a diver, such as ascending at an excessive rate, going too deep, or staying too long at depth, may be overcome if the diver carefully follows the Aladin® Pro's corrected ascent instructions. Of course, the Aladin® Pro can do nothing to prevent the occurrence of lung overexpansion injuries or nitrogen narcosis, whose avoidance lies solely with the individual diver. The Aladin® Pro is a highly sophisticated technical instrument which, if used and maintained properly, will have high reliability. Despite that, no dive should be made with an Aladin® Pro without a thorough understanding of decompression theory and dive table use, and every diver must have a set of decompression tables with him on every dive.

WARNING

Do not use the Aladin® Pro without a set of accepted diving tables with you as a back up decompression tool on every dive.

Should decompression sickness occur, whether the Aladin® Pro was used correctly or not, a detailed history of the previous dives may be used to allow a better diagnosis and the most effective treatment for the diver.

1. The Aladin System ____ **10**

2. Operation ____ **12**

2.1 Operating scheme for surface functions ____ **13**

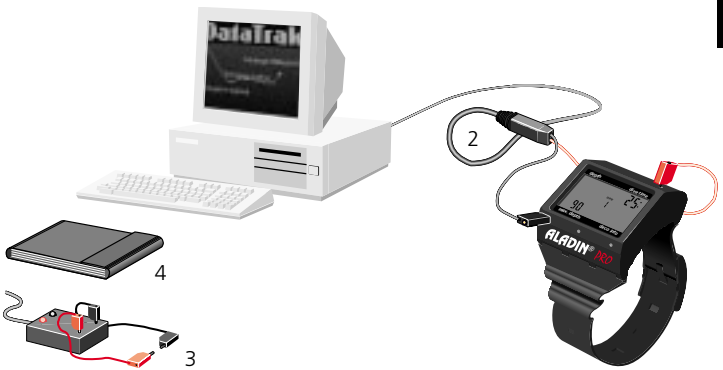
2.2 Operating modes ____ **18**

1

The dive computer as the central unit of the Aladin® system becomes a valuable aid by a number of additional features:

1. During the dive the Aladin® Pro dive computer supplies all important dive- and decompression information and warnings if necessary. It has a logbook with the last 19 dives and a dive planner.

2. The configuration software DataTalk (supplied together with DataTrak) allows the alteration of a number of preset parameters of Aladin® Pro.



3. The external memory extension (ESE) makes it possible to read data from the logbook memory of Aladin® Pro without a personal computer. This is especially valuable on diving holidays.

4. The logbook software DataTrak enables you to print out logbook pages. You can get a special logbook with insert folders from your retailer.

2. Operation

Switching on display:

– automatically, on submerging in water or when adaptation to atmospheric pressure is necessary.

– manually by manipulating contacts on housing.

Switching off display:

– automatically, after three minutes without operation.

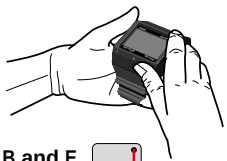
Aladin® Pro has 4 operating contacts B, E, +, – on the outside of the housing. For manual operation, touch base contact B and any one of the other three contacts below the display with moistened fingers.

Contact B: Base contact, which has to be touched for all operations.

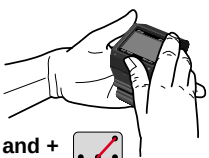
Contact E: Enter contact. It serves the switching on of the computer, the activation of logbook and dive-plan-mode, and the switching between no-stop and decompression planning. It is also used to confirm inputs and is therefore comparable to the ENTER- or RETURN-key of a computer.

+ / – contacts: They serve the selection of logbook and dive-plan as well as the setting of values (time, depth, dive-number etc.).

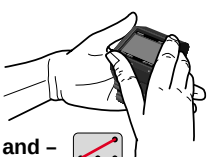
3.2 Operating scheme for surface functions



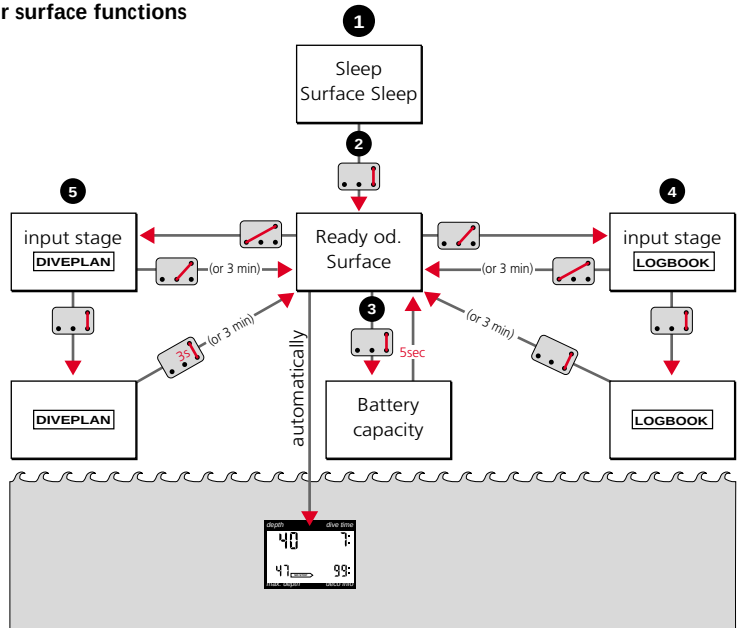
B and E

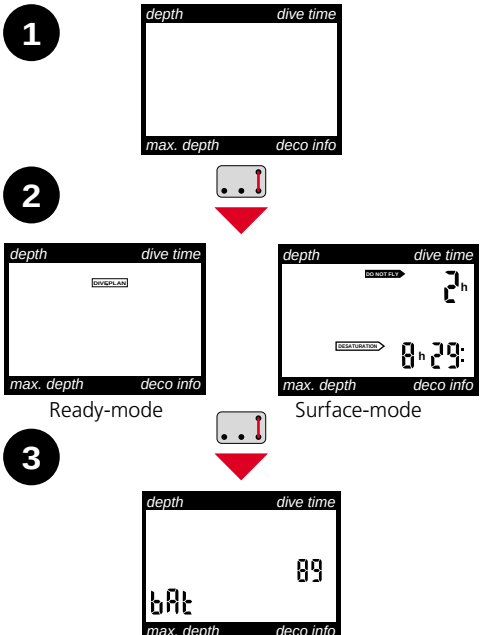


B and +



B and –

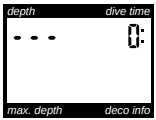




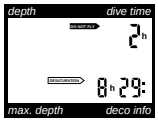
1. Aladin® Pro is in a state of rest; no information is displayed (-> sleep-mode or -> surface-sleep-mode).

2. Bridging B and E activates the display -> ready-mode or -> surface-mode.

3. A second bridging of contacts B and E activates the display of the remaining battery capacity for approximately 5 seconds.
   As soon as the battery capacity is 0%, a battery alarm is sent (see page 29).
   There is still a small reserve left at bAt 0%.

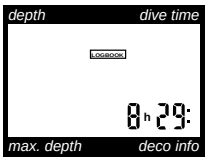


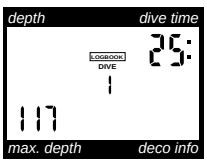
Ready-mode

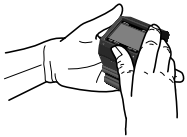


Surface-mode

4

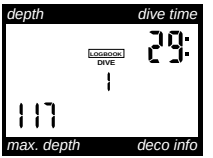


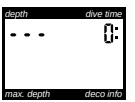




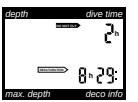
4.a) Selecting the logbook function:
B and +
Back: B and –
or automatically after three minutes

4.b) Activating the logbook:
B and E. Aladin® Pro shows the most recent dive.





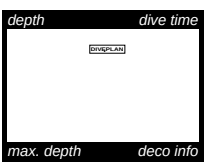
Ready-mode



Surface-mode

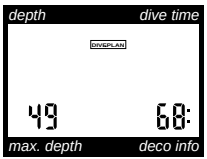
or after
3 minutes

5



4.c) Leaving the logbook:
B and E
or automatically after three minutes.

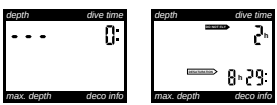
5. a) Selecting the dive-plan function:
B and –.
Back: B and +:
or automatically after three minutes.

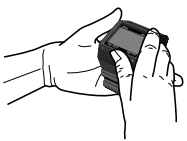


5.b) Activating the dive-plan

B and E. Aladin® Pro starts by listing no-stop times. If the dive-plan is activated out of the surface-mode, enter the desired interval by B and + or B and –. Confirmation with B and E.

or after 3 minutes



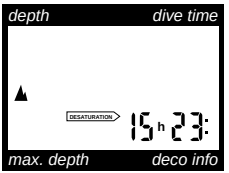


5.c) Leaving the dive-plan:

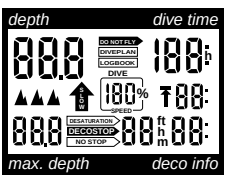
B and E for approx. 3 seconds:
or automatically after three minutes.

2.2 Operating modes

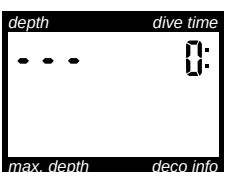
Aladin® Pro works in various operating modes:



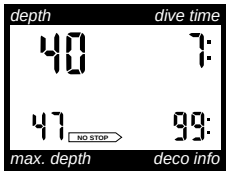
Sleep-mode:
Activation: automatically
When Aladin® Pro is not used, it is in the so called sleep-mode.
In that case, the electronics are "sleeping" in that the display does not show any information. The computer is briefly activated once every minute to measure atmospheric pressure. The display remains switched off. If a change in altitude is recognized, Aladin® Pro switches to -> surface-mode for 3 minutes.



Ready-mode:
Activation: By touching contacts B and E from sleep-mode.
To check the display, all signs light up for 5 seconds.



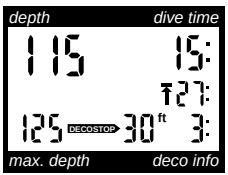
Aladin® Pro switches into ready-mode afterwards. Once in ready-mode, the display is switched on and altitude sections are eventually displayed.
By touching contacts B and E in the ready-mode once more, Aladin® Pro will display the remaining battery capacity by percentage. Three minutes after activating the ready-mode, Aladin® Pro will fall back into the —> sleep-mode.

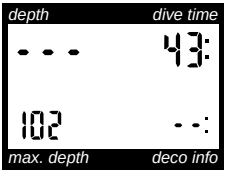


Dive-mode:

Activation: automatically at depth of about 2 ft.

In dive-mode, all diving functions are monitored, i.e. depth and dive time displayed, maximum depth stored, saturation of tissues calculated depending on the temperature, no-stop time or decompression prognosis determined, ascent rate controlled and displayed and the correctness of the decompression procedure supervised.

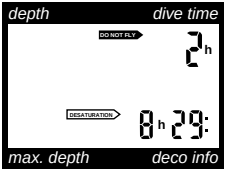


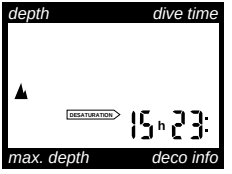


Wait-mode:

Activation: automatically on reaching the surface.

The wait-mode is activated if the diver surfaces (diving depth less than 2 ft). At the surface, the dive is not completed and entered into the logbook for an interval of 5 minutes. This allows a short surfacing for the purpose of orientation.



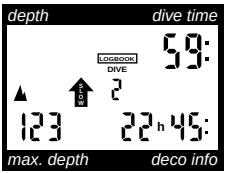


Surface-mode:

Activation: automatically after a dive or when changing altitude.

After a dive has been completed, Aladin® Pro is in surface-mode. All data belonging to the surface interval are calculated and displayed: simulation of microbubble formation, actualization of the saturation of tissues depending on the calculated skin temperature and the assumed work load at the surface, calculation of desaturation time and no fly interval.

In order to save energy, Aladin® Pro falls into the "surface-sleep" after 3 minutes. The functions of surface-mode are then carried out in the background. The atmospheric pressure is measured in surface-sleep once every minute. If the atmospheric pressure decreases, for example in case of change of altitude, Aladin® Pro switches from sleep-mode or from surface-sleep into surface-mode automatically and displays the adaptation time. The adaptation time is the time after which all body tissues have adapted to the ambient pressure (= desaturation time).

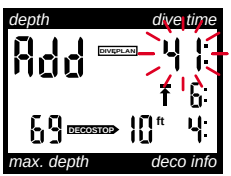


Logbook-mode:

Activation: manually by contacts

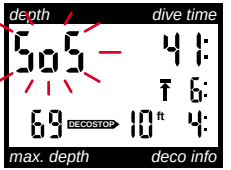
Data of 19 past dives can be called up in the logbook-mode. It shows, for example, maximum depth, dive time, preceding interval, altitude sections and eventual alarms. A dive is entered in the logbook if it has lasted more than 2 minutes. It also shows the interval which has passed since the last dive or a preceding change of altitude.

By means of an interface, Aladin® Pro can be connected with an MS DOS personal computer. In that case, the last 37 dives and the last dive-profiles can be read out. The number of profiles depends on the length of the dives (a total of 200 diving minutes maximum).



Diveplan-mode: Activation: manually by contacts

The diveplan-mode serves the planning of a future dive. It allows the planning of no-stop dives with freely determinable depth and dive time. On repetitive dives, the surface interval can also be chosen at will. Calculations are based on the temperature data of the last dive and assuming normal workload.



SOS-mode: Activation: automatically
If the diver remains above a depth of 4 feet for more than three minutes without observing the prescribed decompression, the computer switches into SOS-mode after the dive and displays <SOS> instead of the depth. The computer is locked from use for the next 24 hours. Desaturation is further calculated including microbubbles in the tissues. Diving is again possible after 24 hours, but the SOS-mode can influence the calculations of Aladin® Pro for three days after the incident due to the possible presence of microbubbles.

If a diver using Aladin® Pro experiences a diving accident resulting in decompression sickness, the dive can be analyzed by means of the PC-interface and *DataTrak*-software.

WARNING

Serious injury or death may result if a diver does not seek immediate treatment at a recompression chamber should any signs or symptoms of decompression sickness occur after a dive.

1. Terminology/Symbols
1.1 Display during no-stop phase ____ **24**
1.2 Display during decompression phase ____ **25**

2. Attention Messages and Alarms
2.1 Attention messages ____ **26**
2.2 Alarms ____ **28**
2.3 Alarm low battery ____ **29**

3. Preparation for the Dive ____ **30**

4. Functions during the Dive
4.1 Dive time ____ **31**
4.2 Current depth ____ **31**
4.3 Maximum depth ____ **32**
4.4 Ascent rate ____ **33**
4.5 Decompression information ____ **35**

5. Functions at the Surface
5.1 End of a dive ____ **38**
5.2 Desaturation time ____ **39**
5.3 No fly time ____ **40**
5.4 Warning of bubbles ____ **41**

6. Diving in Mountain Lakes ____ **42**

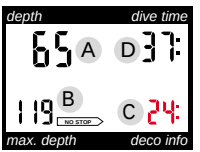
1. Terminology/Symbols

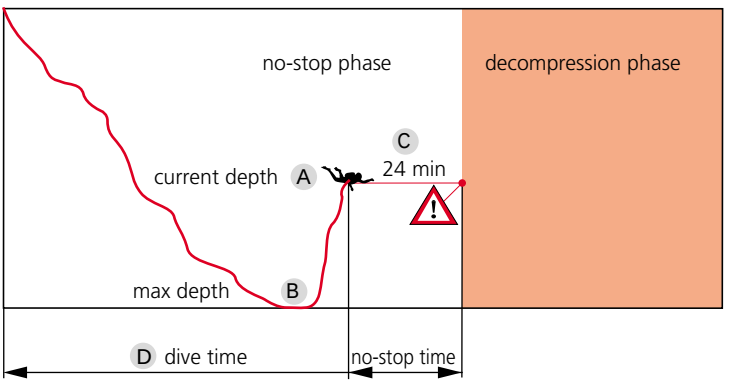
The information on the display of the Aladin® Pro varies depending on the kind of dive and the dive phase.

1.1 Display during no-stop phase

No-stop phase: Dive phase during which ascent is allowed without decompression stops.

Dive time: Time of the dive below depth of 4 ft.





WARNING

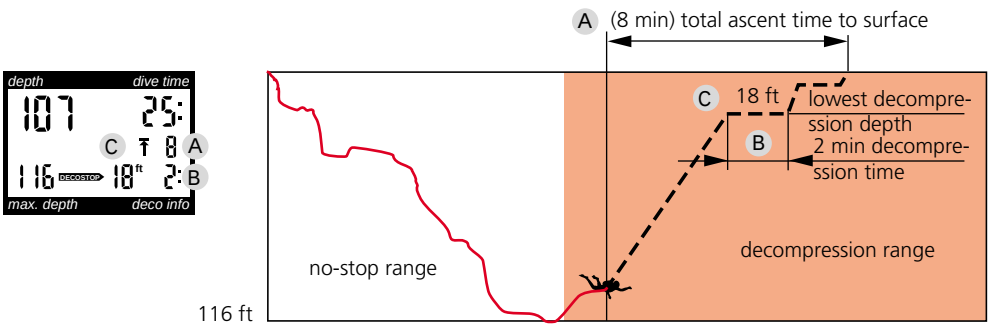
Decompression diving should not be attempted by recreational or sport scuba divers. Do not use the Aladin® Pro for intentional decompression diving.

1.2 Display during decompression phase:

Decompression depth: Lowest stage is displayed.

Decompression time: Prescribed duration of the decompression stop at the displayed decompression stage.

Total ascent time to surface: Total ascent time including decompression stops.



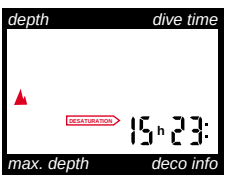
2. Attention Messages and Alarms

Aladin® Pro draws the diver's attention to certain situations and warns the diver of unsafe diving practices. Attention messages and alarms are always optical and acoustic under water, only optical at the surface except the decompression alarm.

The acoustic attention messages (but not the alarms) can be switched off (see chapter VII Interface page 70).

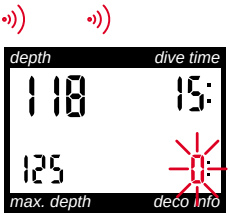
2.1 Attention messages

Attention messages are communicated to the diver optically by lit up symbols, letters or flashing figures. In addition, two short acoustic sequences can be heard (in an interval of 4 seconds) in two different frequencies. Attention messages come up in the following situations:



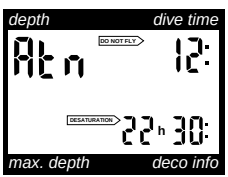
Dive in mountain lake

On a change of altitude, the altitude section (0-3) and adaptation time is shown. See page 42.



End of no-stop phase

In order to prevent a decompression dive: ascend a few feet.



Warning of bubbles

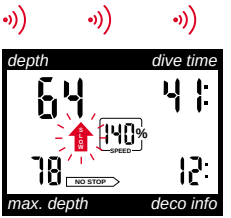
Extension of the surface interval isrecommended. See pages 41 and 64.

WARNING

Serious injury or death may result from failing to immediately respond to alarms given by Aladin® Pro.

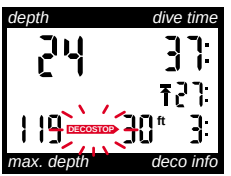
2.2 Alarms

Alarms are given to the diver optically by flashing symbols, letters or figures and symbols. In addition, an acoustic sequence in one frequency can be heard during the whole duration of the alarm.
An alarm occurs in the following situations:



WARNING

Excessive ascent rate.
Reduce ascent rate.



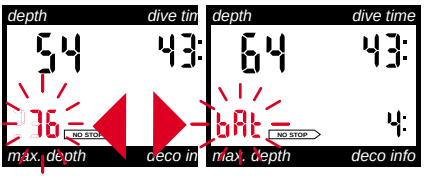
WARNING

Ignoring decompression stop
Descend to the prescribed decompression depth at once!

2.3 Alarm low battery

In dive-mode, <bAT> is indicated by a flashing display and altnerating with the display of maximum depth as soon as battery capacity is 0%.

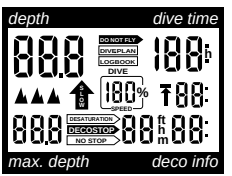
In ready-mode and surface-mode, <bAT> is shown instead of maximum depth. Have the batteries changed by your retailer!



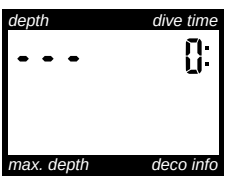
3. Preparation for the Dive

Basically, Aladin® Pro need not be switched on manually. When submerged in water, the contacts are bridged by the water and the dive computer switches into dive-mode directly.

But it is advisable to check the functions immediately before the dive in the diving location:



1. **Switching on Aladin® Pro manually**
   Bridge contacts B and E with moistened fingers. Check test display: are all displays lit?



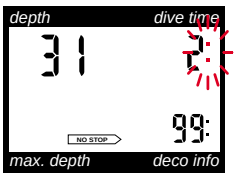
2. **The Aladin® Pro is now in ready-mode**
   After three minutes without operation or submerging in water, Aladin® Pro switches off the display. It need not be switched on again. It switches on automatically on submerging in water and activates the dive-mode as soon as a depth of more than 2 feet is reached. The display of the depth may appear a little delayed.

In extremely pure freshwater, it is possible that the Aladin® Pro will not automatically activate into the dive-mode.

4. Functions during the Dive

4.1 Dive time

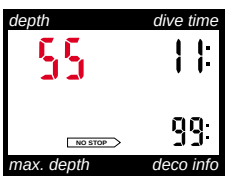
The whole time spent below a depth of 4 feet is displayed as dive time in minutes. While the dive time is running, the colon on the right of the figures is flashing in one second intervals. Maximum dive time displayed is 199 minutes.

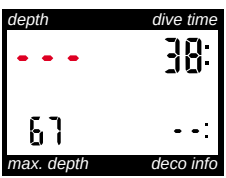


If a dive lasts longer than 199 minutes, dive time is continued at 0 minutes, because the display cannot show a larger figure.

4.2 Current depth

Current depth is given in 4 inch-increments. On switching on and at a diving depth of less than 2 ft the void display <—> appears.

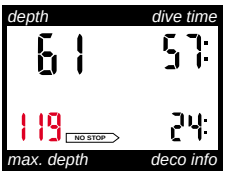




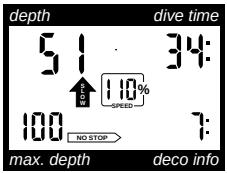
Depth measurement is based on fresh-water. Therefore, Aladin® Pro shows a slightly greater depth than actually true when diving in salt water, depending on the salinity of the water.

4.3 Maximum depth

Maximum depth is displayed if it is lower than the current depth (maximum indicator function). To prevent the display changing very frequently when diving in the vicinity of maximum depth, it is only displayed if it exceeds the current depth by more than three feet.



4.4 Ascent rate



Optimal ascent rate varies depending on depth between 23 and 67 ft/min. It is displayed in percent of the reference variable. If the ascent rate is greater than 100% of the set value, the black arrow <SLOW> appears. If the ascent rate exceeds 140%, the arrow starts flashing.

The Aladin® Pro provides an acoustic alarm if the ascent rate is 110% or greater of the set value. The intensity of the alarm increases in direct proportion to the degree the prescribed ascent rate is exceeded.

WARNING

The prescribed ascent rate must be observed at all times! Exceeding the prescribed ascent rate can lead to microbubbles in the arterial circulation which can lead to serious injury or death due to decompression sickness.

- The Aladin® Pro may require a decompression stop even within the no-stop phase because of the danger of the formation of microbubbles due to an improper ascent.
- Decompression time necessary for the prevention of microbubbles can increase massively if the ascent rate is exceeded.
- At great depth, too slow an ascent may cause heightened saturation of tissues and an extension of both decompression time and total ascent time. At shallow depth, a slow ascent may shorten decompression time because the tissues are desaturating during a shallow, slow ascent.

Messages:

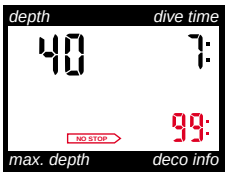
WARNING

Ascent rate	Optical alarm	Acoustic alarm
110% SPEED	SLOW	•)) •)) •)) •))
140% SPEED	SLOW	•)) •)) •)) •))
160% SPEED	SLOW	•)))) •)))) •)))) •))))
180% SPEED	SLOW	•)))))) •)))))) •)))))) •))))))

Excessive ascent rates of longer periods are entered in the logbook.
Response: Reduce ascent rate

4.5 Decompression information

No-stop time is displayed if no decompression stops are necessary. The arrow NO STOP is visible if no decompression stops are necessary. The figures indicate no-stop time in minutes.

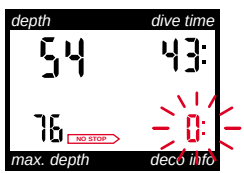


- No-stop display <99:> means remaining time of 99 minutes or more.
- No-stop time is calculated on assuming normal workload and current water temperature.

WARNING

There is an acoustic alarm if no-stop time is less than 1 minute. In this last minute, the no-stop display shows the flashing value <0>.

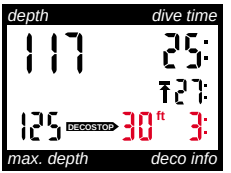
Response: In order to prevent a decompression dive, you must ascend a few feet after this message.



WARNING

It is dangerous and an unsafe diving practice to "push" the Aladin® Pro or any other decompression tool to its limits. Avoid no-stop times of less than three minutes at any given depth.

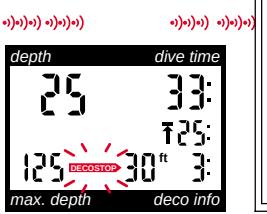
Decompression values



On entering the decompression phase, the arrow NO STOP disappears. The arrow DECOSTOP appears. Right beside the arrow, the deepest decompression stage in feet is displayed. Beside the decompression depth, the decompression time of the displayed stage in minutes appears. The display <30ft 3:> means that a decompression stop of 3 minutes at a depth of 30 ft has to be made.
When a decompression stop has been finished, the next higher decompression stop is displayed. When all decompression stops have been made, the arrow DECOSTOP extinguishes and the arrow NO STOP reappears. The indication of time on the lower right shows the no-stop time again.

Messages:

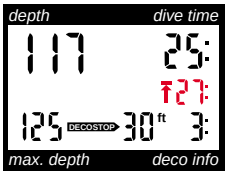
WARNING



The decompression alarm is activated if the decompression stop is ignored. Arrow DECOSTOP begins flashing and an acoustic alarm is initiated. Due to the formation of microbubbles decompression can increase massively if a decompression stop is ignored. When the surface is reached during the decompression alarm, the arrow DECOSTOP continues flashing, in order to point to the risk of a decompression accident. The SOS-mode is activated 3 minutes after the dive if corrective action is not taken.
If the total (cumulative) duration of the decompression alarm is longer than a minute, it is entered in the logbook.

Response: Descend to the prescribed decompression depth immediately!

Total time of ascent

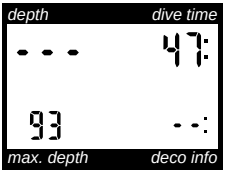


As soon as decompression stops are necessary, Aladin® Pro shows the total time of ascent. The time of ascent to the first decompression stage and all decompression stops are included.

The time of ascent is calculated on the basis of the prescribed ascent rate. Total time of ascent can be subject to change if the ascent rate is not ideal (100%).

5. Functions at the Surface

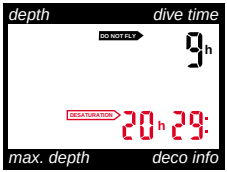
5.1 End of a dive



After reaching the surface, Aladin® Pro switches into wait-mode automatically for five minutes. This is the time span necessary to recognize the end of the dive. The delay allows the diver to come to the surface for orientation and to resume the dive afterwards.
When the dive is closed after 5 minutes in wait-mode, it is entered into the logbook and Aladin® Pro switches into surface-mode.

In surface-mode, Aladin® Pro shows desaturation time and no fly time.

5.2 Desaturation time

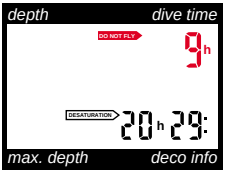


When DESATURATION appears, the Aladin® Pro is in surface-mode. Desaturation time in hours and minutes is displayed next to that. Desaturation time is continually indicated until the next dive or until it reaches zero. The display is switched off to save energy three minutes after the last manipulation is made (surface-sleep-mode).

In some cases, desaturation times with the Aladin® Pro are considerably longer than those of its predecessors. This is because the calculation model assumes reduced physical activity at the surface (therefore less nitrogen off gassing) and uses shorter half-times.

If desaturation time reaches zero, the "tissue" models of the Aladin® Pro are desaturated and it switches into the sleep-mode.

5.3 No fly time



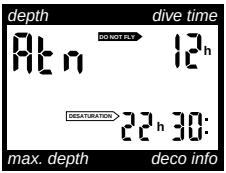
The waiting period until the next flight is indicated as follows: DO NOT FLY. Beside this indicator is the time in hours that should pass before a flight.

Next to that display the time in hours until it is considered appropriate to fly is displayed (because of recalibrated desaturation time).

WARNING

Flying while the Aladin® Pro displays "DO NOT FLY" may lead to serious injury or death from decompression sickness.

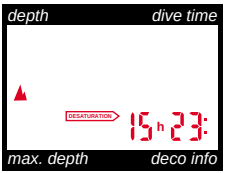
5.4 Warning of bubbles



Through repetitive dives microbubbles may accumulate in the lungs if the surface interval is not long enough. Ignoring decompression stops or an excessive ascent rate can also lead to bubbles in tissues. In order to reduce the risk of decompression sickness for future repetitive dives, the surface interval should be planned long enough to reduce the risk of decompression sickness. If Aladin® Pro calculates that the formation of microbubbles may occur during the surface interval, it will advise a diver to extend the surface interval. If the display <Atn> (=attention) is visible instead of the depth during the surface interval (surface-mode), the diver should extend the surface interval. Through the extension of the interval the diver may prevent a high concentration of bubbles in the lungs during the planned dive and avoids a situation of higher risk.

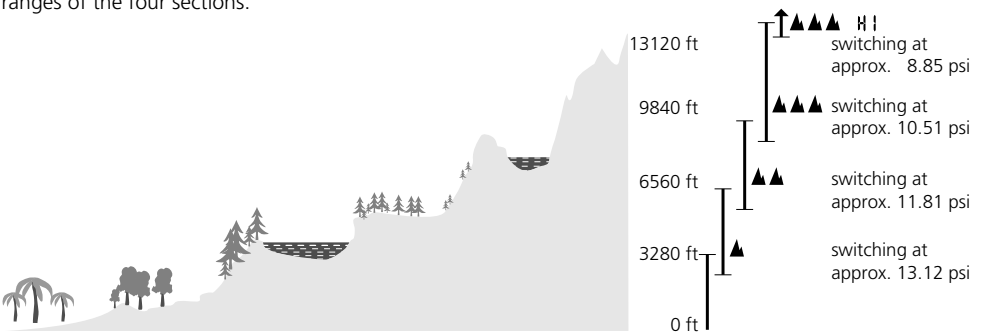
– If the dive has to be made during <Atn>-time, the <Atn> time of the following dive can increase considerably.
– If the dive is made in spite of the display <Atn>, the diver must cope with a clearly shorter no-stop time and an extension of decompression.

6. Diving in Mountain Lakes

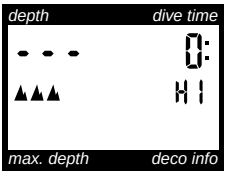


Aladin® Pro measures the atmospheric pressure even while in sleep-mode. If the computer detects a higher altitude, it switches into surface-mode automatically. Desaturation time indicated at this moment refers to adaptation time at this altitude. If diving starts within this adaptation time, Aladin® Pro treats it as a repetitive dive, since the body still has a higher saturation.

The entire altitude range is divided into four sections which are influenced by barometric pressure. That is why the defined altitude sections overlap on their fringes. The altitude section is indicated at the surface, in the logbook and in the dive planner by stylized mountains, if a mountain lake altitude is reached. Sea level to an altitude of approximately 3000 ft is not indicated. In the following, you can see the approximate altitude ranges of the four sections:



In order to assure optimal decompression even at higher altitudes, the 10 ft decompression stage is divided into a 13 ft stage and a 7 ft stage (the pescribed decompression depths are, in sequence, 7 ft, 13 ft, 20 ft, 30 ft).

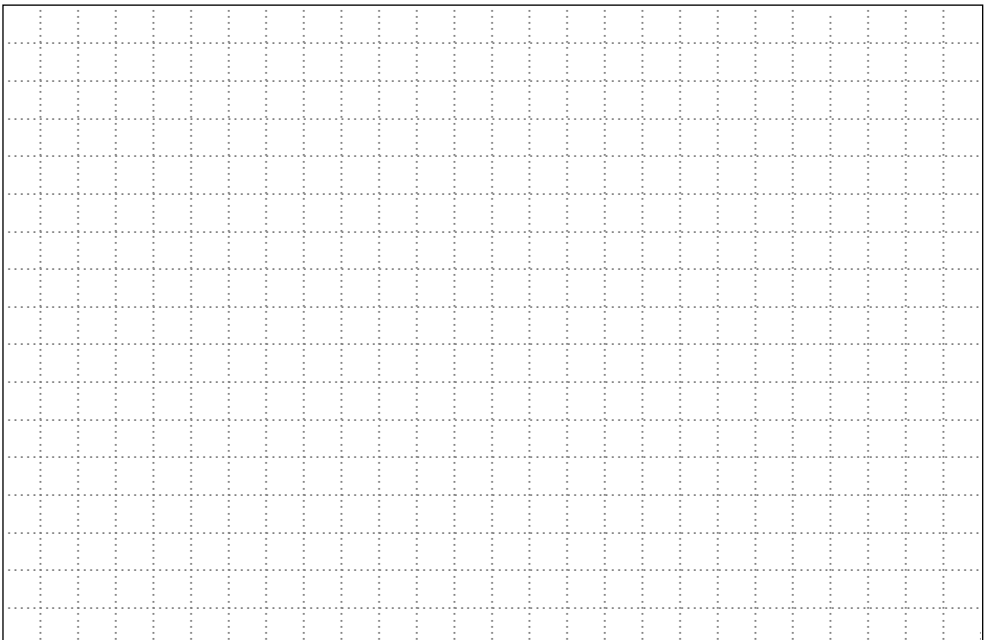


Aladin® Pro can be used as decompression computer in case of an emergency up to an altitude of 13123 ft. If atmospheric pressure is below 8.99 psi (altitude higher than 13123 ft above sea level), no decompression information is displayed. Dive-plan-mode can no longer be started, since no decompression information is available. Beside the display of the altitude section 3, <HI> (=high) appears, telling the diver that he will not get any decompression information for the dive.

Even the smallest differences in the pressure receptors can cause an indication of different altitude sections of two dive computers at the same altitude on the fringes of the altitude ranges. These differences are not meaningful and do not interfere with the functions of Aladin® Pro. But if an altitude section is displayed at sea level or the altitude read outs of two computers differ by more than one altitude section (e.g. section 2 instead of 0), there may be a defect of the computer. In this case, send your computer back to your retailer for checking.

WARNING

Diving while at altitude can considerably increase the risk of decompression sickness. Do not undertake high altitude diving without being specifically trained in the special techniques of such diving.



IV DIVING AT REDUCED RISK WITH ALADIN® PRO

1. Diving at Reduced Risk with Aladin® Pro

1.1 Diving at reduced risk _____ 46
1.2 Minimizing risk on repetitive dives _____ 48
1.3 Response in increased risk situations _____ 49

1. Diving at Reduced Risk with Aladin® Pro

1.1 Diving at reduced risk

Analyzing the most recent results of decompression research and statistical analysis of diving accidents involving decompression sickness allows for the creation of guidelines for diving at reduced risk for decompression sickness. Aladin® Pro recognizes and reacts "intelligently" to certain risk situations. Of course, it is much better that each individual diver avoids these higher risk situations altogether. Yet if a decompression accident does occur, the optional PC-interface allows the analysis of the dive profile and certain risk parameters to provide more complete information for treatment purposes. The following are highly recommended suggestions for reducing the risk of decompression sickness.

Neither the Aladin® Pro nor any other diving computer or decompression table can guarantee that decompression sickness will not occur even if the computer or table is used correctly and all of the following precautions are followed.

- In accordance with the recommended maximum diving limit, do not dive deeper than 130 feet.
- Do not use the Aladin® Pro for planned decompression diving. The decompression algorithm contained in the Aladin® Pro should be used only for emergency or unintended decompression.
- On all dives with the Aladin® Pro, make a safety stop for three to five minutes within the ten to thirty feet zone.
- Never use the Aladin® Pro for repetitive, "square" dives deeper than 60 feet. A square dive is performed for its duration at a uniform depth.

1. Diving at Reduced Risk with Aladin® Pro

- Always make the deepest dive of the day first when repetitive dives are planned, and for each successive dive make sure that the deepest portion of that dive is done at the beginning of the dive.
- The Aladin® Pro is designed for dives made with compressed air only. Do not use the Aladin® Pro for dives made with nitrox or other mixed gases.
- All divers using dive computers to plan dives and indicate or determine decompression status must use their own diving computer.
- On any given dive, both divers in a buddy pair must follow the most conservative dive computer for that particular dive.
- If the Aladin® Pro fails at any time during the dive, the dive must be terminated, and appropriate surfacing procedures should be initiated immediately.
- You should not dive for a period of twenty-four hours before activating the Aladin® Pro to use it to plan or control your diving.
- You MUST follow the ascent rates as indicated by the Aladin® Pro and if the computer should fail for any reason, you must ascend at a rate of no greater than 60 feet per minute.

- You MUST be familiar with all signs and symptoms of decompression sickness before using the Aladin® Pro! Seek IMMEDIATE treatment for decompression sickness should any of these signs or symptoms occur after a dive! There is a direct correlation between the efficacy of treatment and the delay between the onset of symptoms and the treatment for decompression sickness.

- Always observe the optical and acoustic alarm signals of the Aladin® Pro. Avoid situations of increased risk which are marked with a warning sign in this operating manual.

- Never dive the Aladin® Pro to the limit. Neither the Aladin® Pro nor any other diving computer or decompression table should be pushed to its limit. Give yourself a margin of safety by always leaving at least a few minutes in the "no-stop" box before making your ascent.

- Avoid repeated ascents and descents (yo-yo diving) while using the Aladin® Pro.

1.2 Minimizing risk on repetitive dives

With consecutive repetitive dives, there will be excess nitrogen in the body due to the accumulation of nitrogen on the preceding dive. Depending on the length of the surface interval, there could even be gaseous nitrogen (microbubbles) in your body. This accumulation of both soluble as well as potentially gaseous nitrogen in the body can greatly increase the risk of decompression sickness on subsequent dives. That risk can be minimized.

- Always make your first dive the deepest dive of the day.

- Always make the deepest descent of each given dive on a particular day at the beginning of that dive.

- Never make “square“ dive profiles of 60 feet or greater as repetitive dives.
- Avoid yo-yo diving during repetitive dives.
- Plan for a minimum surface interval of three to four hours.
- Do not attempt to repetitive dive if the <Atn> is visible on the display.
- Take a day off from diving every three or four days.
- Avoid exertion at depth and during the ascent.
- Make sure you always have enough air for the ascent.

1.3 Response in increased risk situations

If the dive includes an increased risk situation, Aladin® Pro reacts automatically to warn the diver of this risk. A change of decompression may be indicated to minimize the risk. The diver can further reduce the risk through his conservative diving practices on the next dive and at the same time prevent long decompression stops.

A few examples on the following pages:

Situation: The diver ascends too rapidly:

Reaction of computer: The model calculates the formation of bubbles due to the excessively rapid ascent. No-stop time is shortened or a longer (and eventually at greater depth) decompression prescription is displayed in order to assure increased decompression.

Recommended response of the diver

During the dive:
- Observe the new decompression prescription shown by Aladin® Pro.

After the dive:
- Watch out for symptoms of arterial gas embolism and decompression sickness.
- Seak immediate medical attention at a recompression chamber should any signs or symptoms of decompression sickness appear.
- Before the next dive, plan a sufficiently long interval (display <Atn> should disappear).

WARNING An exessive ascent rate can lead to serious injury or death from decompression sickness.

WARNING Failure to seek IMMEDIATE treatment for any signs or symptoms of decompression sickness after a dive may result in serious injury or death.

Situation: The diver disregards the prescribed decompression depth.

Reaction of computer: The model calculates the formation of bubbles due to ignoring decompression. A longer (and eventually at greater depth) decompression is displayed in order to assure sufficient time for desaturation.

Recommended response of the diver

During the dive:
- Descend to the prescribed decompression depth at once.
- Do not descend to greater depths during the dive.
- Observe the decompression prescribed by Aladin® Pro.

After the dive:
- Watch out for symptoms of arterial gas embolism and decompression sickness.
- Before the next dive, plan a sufficiently long interval (display <Atn> should disappear).

WARNING Failure to comply with all decompression information on the Aladin® Pro may result in serious injury or death due to decompression sickness.

WARNING There is a risk of decompression sickness on every dive even if all precautions described in this manual are taken.

Situation: The diver is physically exerting himself or herself, (e.g. swimming against the current).

Recommended response of the diver

During the dive:
- Avoid further physical exertion if possible. Relax.
- Extend decompression time at the highest stop if possible.

After the dive:
- Refrain from heightened physical exertion on your next dive.
- Make sure the surface interval is long enough. It may be advisable to go on another dive only the next day.

1. Diving at Reduced Risk with Aladin® Pro

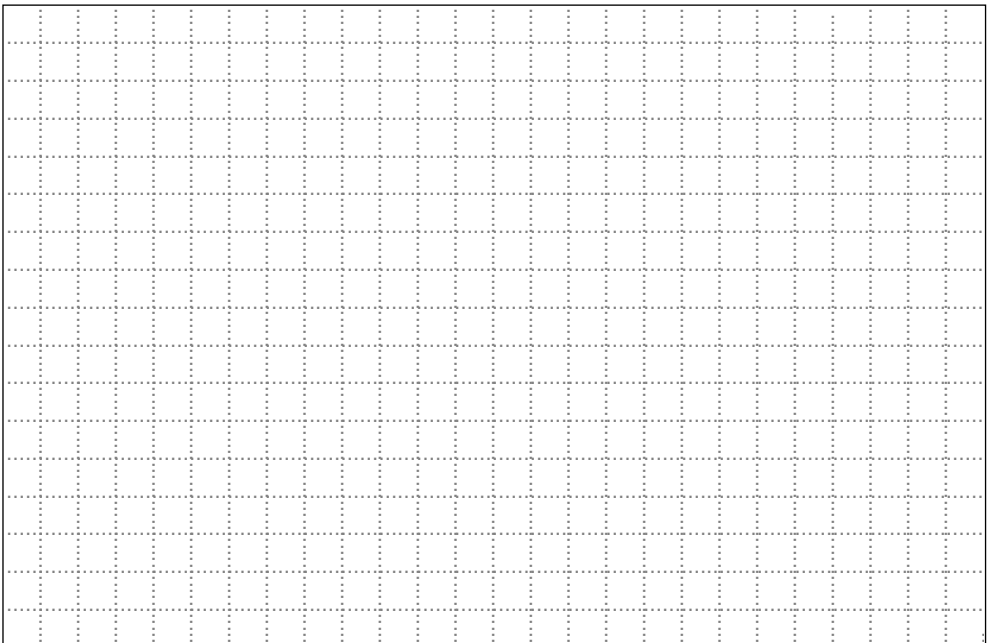
Situation: It is very unlikely to have a surface interval long enough to clear the <Atn> prior to the next dive during an organized dive trip from a boat. This previous buildup of nitrogen must be taken into consideration for the next dive.

Reaction of computer: Aladin® Pro calculates a shorter no-stop time or decompression prescription to reduce the risk of decompression sickness.

Recommended response of the diver

During the dive: Dive conservatively on all repetitive dives. Limit your maximum depth to no more than 75 feet at the very beginning of the dive and make a very slow ascent.

After the dive: Before the next dive, plan a sufficiently long surface interval (<Atn> display should disappear).



1. Survey ____ 56

2. Selection and Activation ____ 57

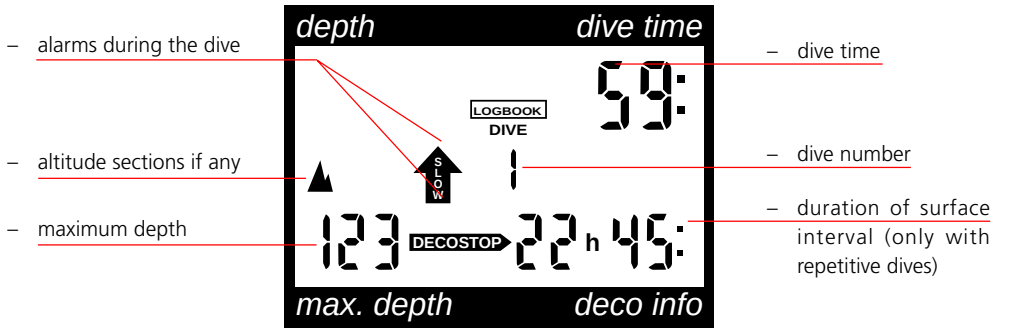
3. Selection of Dive ____ 58

4. Leaving the Logbook-Mode ____ 59

5. Output on PC ____ 60

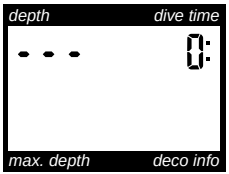
1. Survey

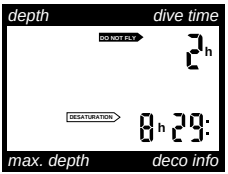
Aladin® Pro features a logbook with the last 19 dives. A dive is only entered in the logbook if dive time is longer than 2 minutes. Displayed information of the dive:



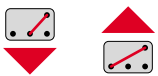
If a dive is started within adaptation time (after a change of altitude), the adaptation time is displayed instead of the surface interval.

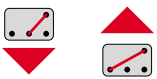
2. Selection and Activation



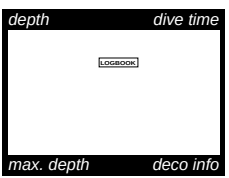


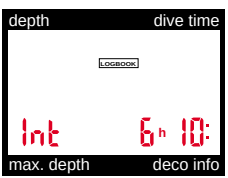
1. The logbook is selected by bridging contacts B and + in ready- or surface-mode. Indication LOGBOOK appears. If Aladin® Pro has been in surface-mode before, the surface interval appears as well. You go back into ready- or surface-mode by B and –.

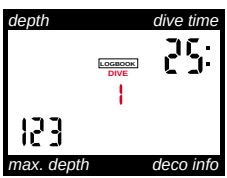




2. In order to activate the logbook, bridge contacts B and E. The most recent dive is displayed (DIVE I).

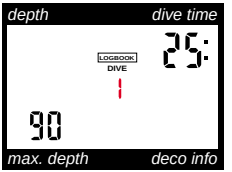


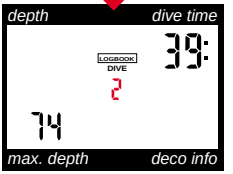


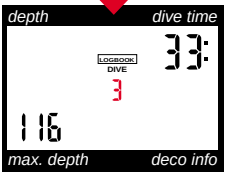


V

3. Selection of Dive





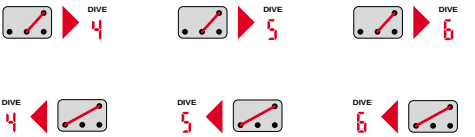


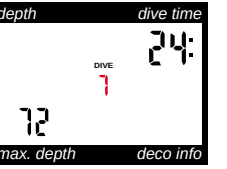
1. Bridge contacts B and + to get the information of the dive preceding the most recent one. Display <DIVE 2> appears.

2. On every further bridging B and + the logbook jumps to the next older dive (DIVE 3).

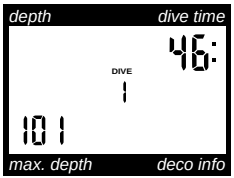
3. On constant bridging of the contacts all dives are displayed successively.

4. Bridging contacts B and – allows switching back from older dives to more recent ones.



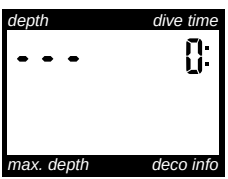


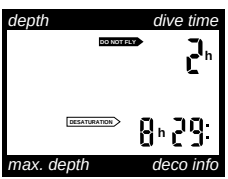
4. Leaving the Logbook-Mode



Touch contacts B and E.
Aladin® Pro switches back into ready- or surface-mode.
This also happens 3 minutes after activating logbook-mode.

or after 3 minutes





5. Output on PC

By means of a PC-interface, available as an accessory, and the *DataTrak* software, information on the last 37 dives can be read out. In the same way, the dive profiles of the last dives, up to a total of 200 minutes, can be represented (see page 71).

Time and date of the dive are entered automatically, based on the clock of the PC-system when the data are transferred via interface.

The possibilities and the procedure of this data transfer are described in a separate manual.

1. Survey ____ 62

2. Selection and Activation from Ready-Mode ____ 63

3. Selection and Activation from Surface-Mode ____ 64

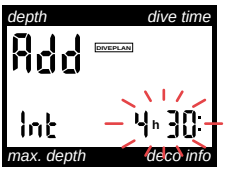
4. Planning a No-Stop Dive ____ 65

5. Planning a Decompression Dive ____ 67

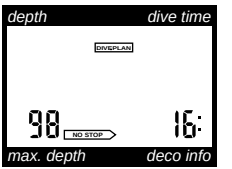
6. Leaving the Diveplan-Mode ____ 68

1. Survey

The Aladin® Pro is equipped with a dive planner which allows the planning of no-stop dives with freely determinable surface interval. The water temperature of the most recent dive and eventual altitude sections <▲▲> are incorporated in the calculation.



Presetting the surface interval (only during desaturation)

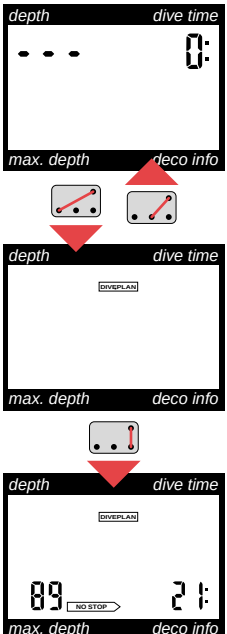


Planning of no-stop dives

WARNING

Planned decompression dives violate the responsible diving practice standards of every major diving organization. They are not to be attempted by recreational or sport scuba divers. Only professional divers with extensive experience, training and the appropriate equipment for decompression diving (including the presence of an on board recompression chamber) should attempt to plan a decompression dive!

2. Selection and Activation from Ready-Mode



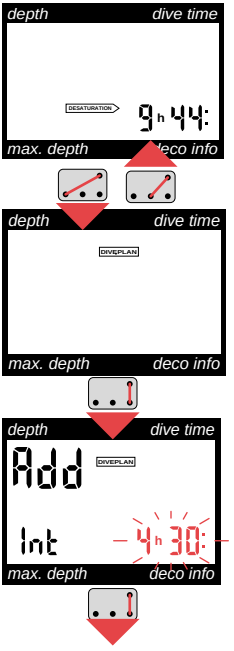
1. From ready-mode, you switch into the diveplan input stage with contacts B and –.

2. The display shows DIVEPLAN.
You return to ready-mode by B and +.

3. Contacts B and E afterwards activate the planning mode.

4. The display shows no-stop times for increasing depths (scrolling no-stop times, see page 65, planning of a no-stop dive).

3. Selection and Activation from Surface-Mode



1. From surface-mode, you switch into the diveplan input stage by B and –.

2. The display shows DIVEPLAN.
You return to surface mode by B and +.

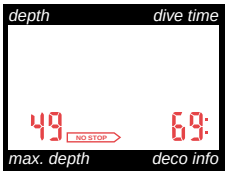
3. After confirming by B and E, the display shows <Add>, <Int> and the interval (flashing). Aladin® Pro expects your input for the duration of the dive interval.

4a. If no surface interval is to be entered, (diving at the present moment), confirm this with contacts B and E, and you switch into no-stop planning.

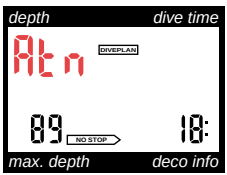
4b. You can extend the interval with contacts B and E.
B and – shorten the interval.

5. You confirm the new surface interval and get into no-stop planning (page 65).

4. Planning a No-Stop Dive



After confirming the surface interval (if possible), no-stop times are displayed in 10-ft-increments. The process starts with the plan depth of the no-stop time which must be shorter than 99 minutes. The no-stop time for every 10-ft-increment is displayed for about 3 seconds (scrolling no-stop times).



Repetitive dives usually cause more microbubbles in the lungs than first dives if the surface interval is not long enough. Too rapid an ascent and/or disregarding decompression instructions can lead to microbubbles. By calculating the formation of bubbles, Aladin® Pro is able to advise the diver to extend the surface interval if necessary. If <Atn> is displayed instead of the depth in addition to the no-stop times, the diver should plan an extension of the interval if possible.

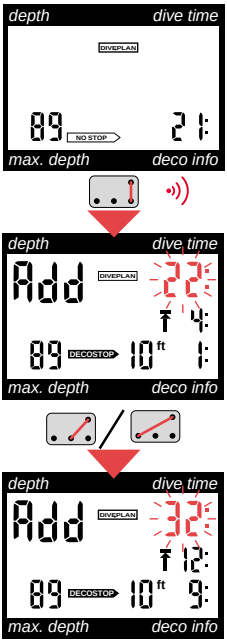
– By repeated recallings of the diveplan with varying surface intervals the minimum interval can be determined.

– When diving in spite of the display <Atn>, a clear shortening of the no-stop time and/or an extension of decompression has to be expected.

– If a dive is made during <Atn>-time, the <Atn>-time following the dive can increase considerably.

Making a repetitive dive when <Atn> is displayed will increase your risk of serious injury or death from decompression sickness!

5. Planning a Decompression Dive



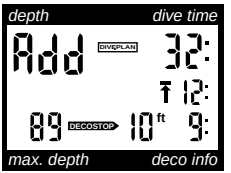
WARNING

Planned decompression dives violate the responsible diving practice standards of every major diving organization. They are not to be attempted by recreational or sport scuba divers. Only professional divers with extensive experience, training and the appropriate equipment for decompression diving (including the presence of an on board recompression chamber) should attempt to plan a decompression dive!

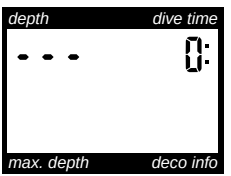
1. In order to plan a dive that requires decompression, wait until the scrolling no-stop time shows the desired depth.
2. By means of contacts B and E you can switch into decompression planning. Dive time is now one minute longer than no-stop time, and the appertaining decompression information appears.
3. <Add> demands that you set the time. This is done with contacts B and +, B and – respectively. As soon as the contacts are no longer bridged, Aladin® Pro calculates the decompression information for this set time. This calculation takes some time.

If you wish to plan a dive requiring decompression at another depth, switch from decompression planning to no-stop planning by means of B and E. Aladin® Pro again shows the scrolling no-stop times. Now you can switch between no-stop planning and decompression planning at will with contacts B and E.

6. Leaving the Diveplan-Mode



or after 3 minutes



If the contacts B and E are touched for about 3 seconds, Aladin® Pro falls back into ready- or surface-mode. This also occurs three minutes after the activation of the diveplan-mode.

On a short touch of contacts B and E the Aladin® Pro switches back to the scrolling no-stop times.
In order to completely leave the diveplan-mode, B and E must be continually bridged until two acoustic bleeps have occurred.

If two or more divers using computers are planning a dive, planning for all divers has to be based on the dive computer showing the shortest no-stop times. Failure to do this may lead to serious injury or death from decompression sickness.

1. Interface and Logbook-Software *DataTrak/DataTalk*

1.1 Personal programming of the dive computer ___ **70**
1.2 Analysis and storage of real dives _____ **71**

1. Interface and Logbook-Software *DataTrak/DataTalk*

The Aladin® Pro is able to communicate with a personal computer. The connection is established by contact sensors. A special interface cable and the necessary PC-software *DataTrak* (MS-DOS) is available on the market. Communication via interface has a number of advantages:

1.1 Personal programming of the dive computer

Several parameters can be set individually by the user by means of the *DataTalk*-software, e.g.:

– The physical units of water depth and tank pressure can be selected (metric/American).

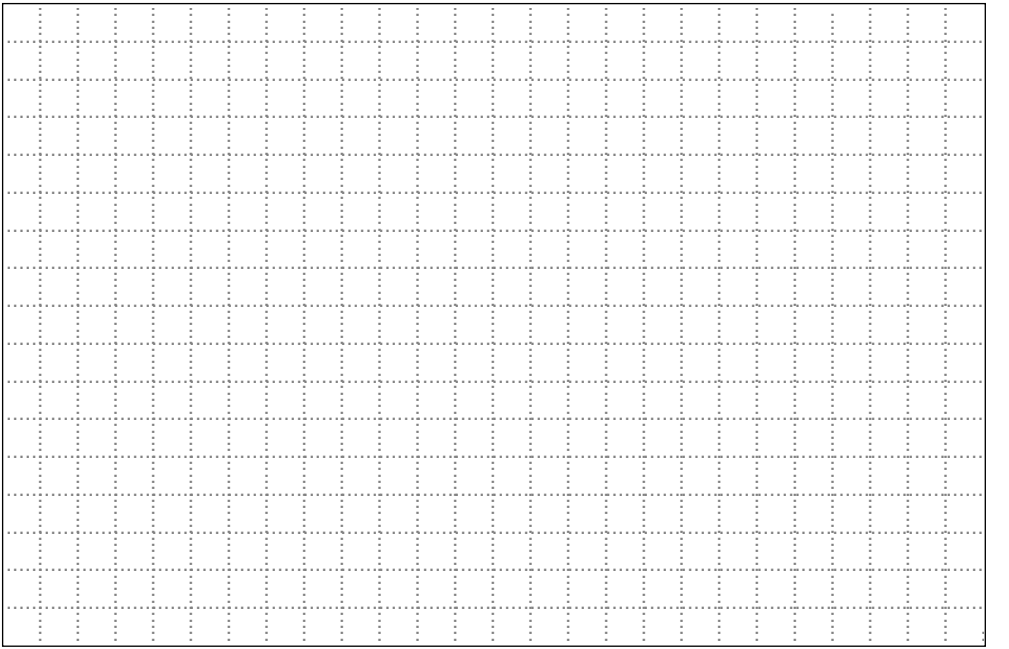
– The attention message acoustic alarm can be switched off if desired (see pgs. 26-27). The actual alarms shown on the face of the Aladin® Pro are not affected by the acoustic alarm being switched off. These actual alarms include ignoring decompression stops, or making too rapid an ascent.

1.2 Analysis and storage of real dives

If you switch off the acoustic alarm of the Aladin® Pro you must pay even more careful attention to the actual alarms on the face of the Aladin® Pro. Failure to follow all alarms whether audible or not may lead to serious injury or death due to decompression sickness, and/or drowning.

1. Interface and Logbook-Software *DataTrak/DataTalk*

The last approx. 200 minutes of dive time are stored by the dive computer in increments of 20 seconds and can be transferred to the PC. The *DataTrak* software allows the representation and analysis of the profiles. Thereby, all relevant data are examined and displayed for every point in time.
The PC program enables the diver to keep a personal logbook. Apart from the 200 minutes of diving, 37 dives are registered in the form of the logbook function of Aladin® Pro. If the data from Aladin® Pro are transferred periodically, all dives are stored in the PC as profiles or in this short form. Time and date of the dives are automatically registered on the data transfer and the dive can be printed out on a page for the diver's logbook.

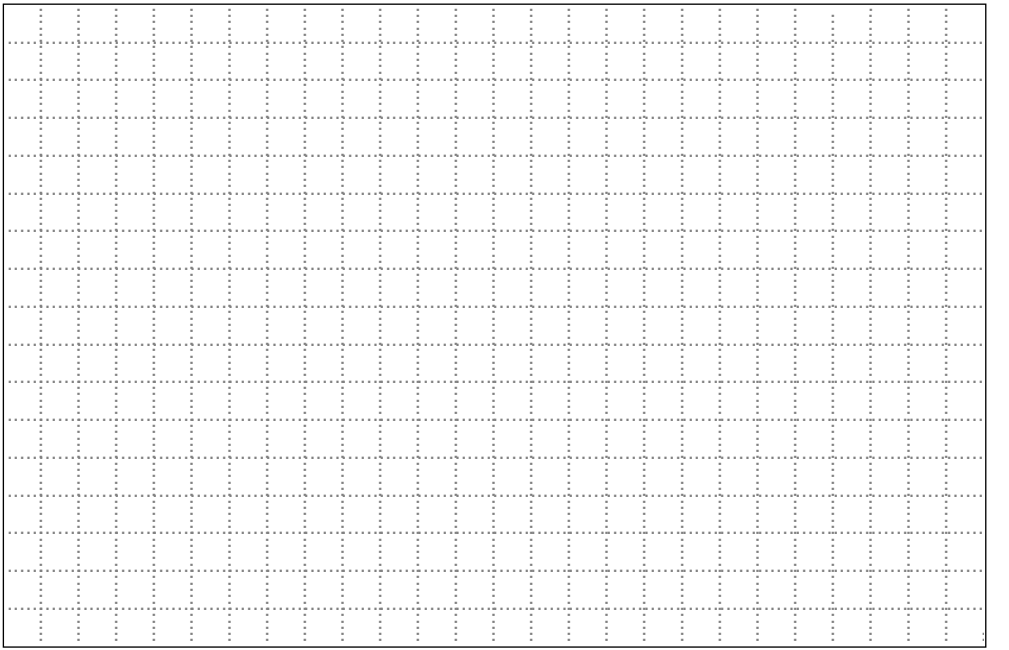


VIII TROUBLE SHOOTING

1. Trouble Shooting ____ 74

symptom	possible reason(s)	response
Altitude section does not correspond to the current altitude.	Atmospheric pressure is especially high or low.	Check barometric information.
	Air pressure measured by the computer is wrong.	Send in dive computer for servicing (only if altitude section is wrong by more than one section, see chapter III 6).
Desaturation time and/or no fly time are very long.	Slow tissue and/or little workload at the surface.	Review chapter III 5 very carefully.
	Too many repetitive dives, yo-yo-diving, square profile repetitive dives or disregarding decompression stops. Dissolved nitrogen and/or microbubbles must be off gassed first.	Plan sufficiently long surface interval and dives at lower risk.
<Atn> appears in place of the diving depth on the display.	Too many repetitive dives, yo-yo-diving, square profile repetitive dives or disregarding decompression stops. Dissolved nitrogen and/or microbubbles must be off gassed first.	Plan sufficiently long surface interval and dives at lower risk. Review chapters III 5 and IV very carefully.

symptom	possible reason(s)	response
An unexpected decompression stop appears in place of no-stop time or decompression increases in leaps.	Too rapid an ascent or ignoring decompression stops have caused a large number of microbubbles, which leads to an attention message (warning of bubbles).	Plan sufficiently long surface interval and dives at lower risk. Review chapters III 5 and IV very carefully.
Attention messages are not given acoustically.	The acoustic signal of the attention messages is switched off.	Reactivate attention messages by means of the interface.



IX APPENDIX

1. Maintenance of Aladin® Pro Dive Computer ____ **78**

2. Technical Information ____ **80**

3. Warranty ____ **81**

3.1 Recognition of warranty ____ **81**

3.2 Scope of the warranty ____ **81**

3.3 Warranty period and claim ____ **82**

1. Maintenance of Aladin® Pro Dive Computer

Your Aladin® Pro is virtually maintenance free. All you need to do is to rinse it carefully with fresh water after each use and do have the batteries changed when needed. To avoid possible problems with your Aladin® Pro, the following recommendations will help assure that it will give you years of trouble free service:

- Avoid dropping or jarring your Aladin® Pro.
- Do not allow your Aladin® Pro to be exposed to direct, intense sunlight.
- Rinse your Aladin® Pro thoroughly with fresh water after each dive.
- Do not store your Aladin® Pro in an air-tight area; make sure there is free ventilation.
- If there are problems with operating the contacts, the surface of your Aladin® Pro housing can be treated with silicone grease. Use soapy water to clean the Aladin® Pro before using silicone grease and dry it thoroughly.

– There are borings in two of the contacts for the reception of the PC interface connection. Free these borings from dirt with a needle if necessary.

Take the dive computer or the transmitter to an authorized retailer in order to change the batteries. The actual change of the batteries is made at the manufacturer's or the importer's. The computer is checked for its technical functioning at the same time.

2. Technical information

Operating altitude: with decompression information: sea level up to approx. 13300 ft
without decompression information: unlimited

Operating depth: no limitation in the permitted range of diving with compressed air

Clock: quartz timer, display up to 199 minutes

Operating temperature: 14 °F to 122 °F

Power supply: Special battery Uwatec LR07

Life of the battery: (standard values)
For an average diving time of 60 minutes and a surface interval of 20 hours after every dive:

Number of dives per year	Life (years)
50	10
100	8
150	6
300	4

3. Warranty

Please pay attention to the following remarks on warranty claims:

3.1 Recognition of warranty

The warranty only covers dive computers which have been provably bought from an authorized retailer or from the manufacturer.

3.2 Scope of the

The manufacturer will repair all defects which are provably retraceable to defects of material or faults in production. The warranty covers the repair of the dive computer free of charge, the replacement of faulty parts or the entire dive computer, respectively.

UWATEC reserves the right to determine the merits of a warranty claim and to determine whether the computer will be repaired or replaced.

Excluded are faults or defects due to:

- excessive wear and tear
- exterior influences, e.g. transport damage, damage due to bumping and hitting, influences of weather or other natural phenomena.
- Servicing, repairs or the opening of the dive computer by anybody not authorized by the manufacturer. This especially concerns the change of batteries of the dive computer.
- pressure tests which do not take place in water
- diving accidents

3.3 Warranty period and claim

The warranty is given for a period of 12 months.

Repairs or replacements during the warranty period do not increase the warranty period.

In order to put forward a warranty claim, send the dive computer together with a dated receipt of the purchase to your authorized retailer or an authorized servicing point.

The manufacturer does not have to accept extensions of the warranty granted by national importers.